

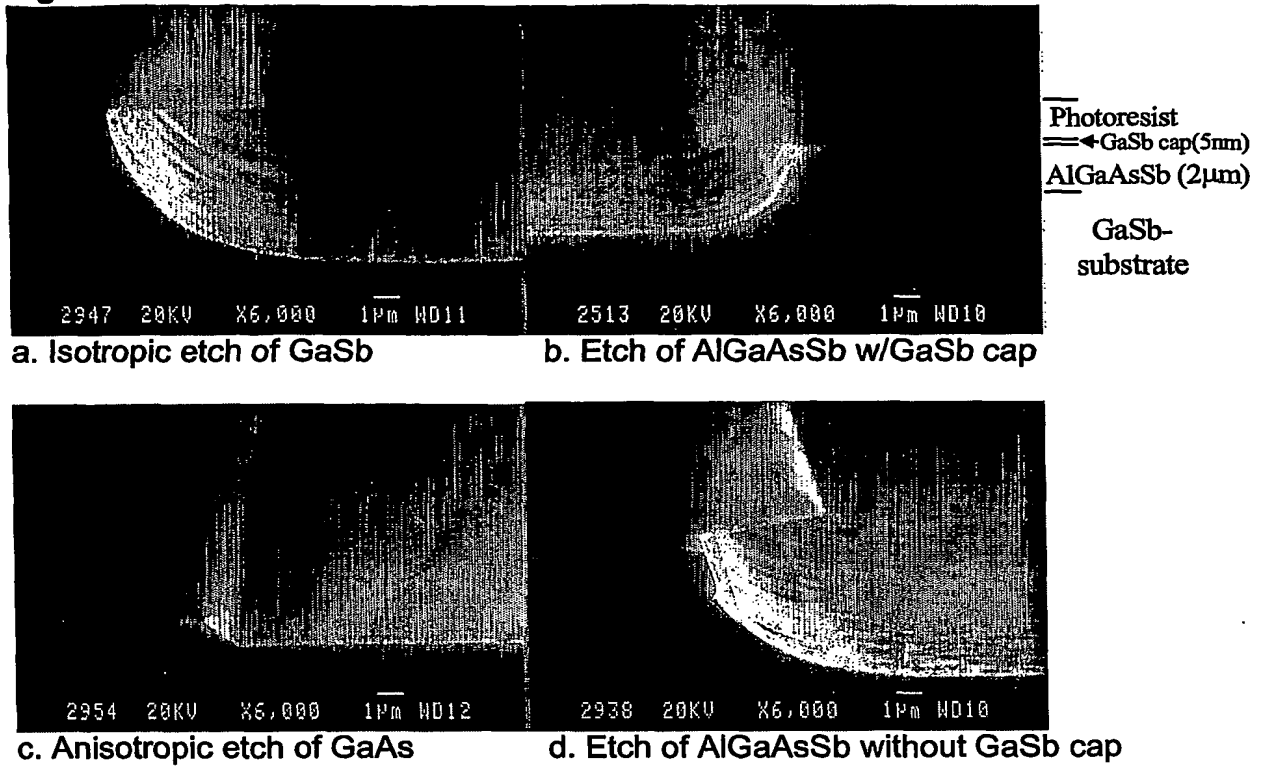
**Figures**

Figure 1. SEM images of etch profiles and depths near the photoresist edge for different materials.

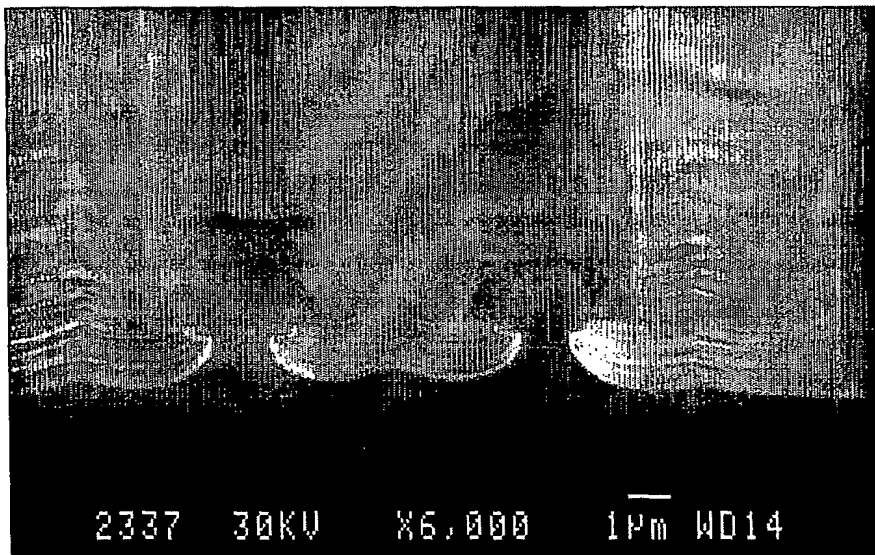


Figure 2. Etch of  $\text{Al}_{0.85}\text{Ga}_{0.15}\text{AsSb}$  (lattice matched to GaSb), with low contents of HF. Selectivity of AlGaAsSb over the GaSb cap can be seen (0.3 vol% HF in figure 9).

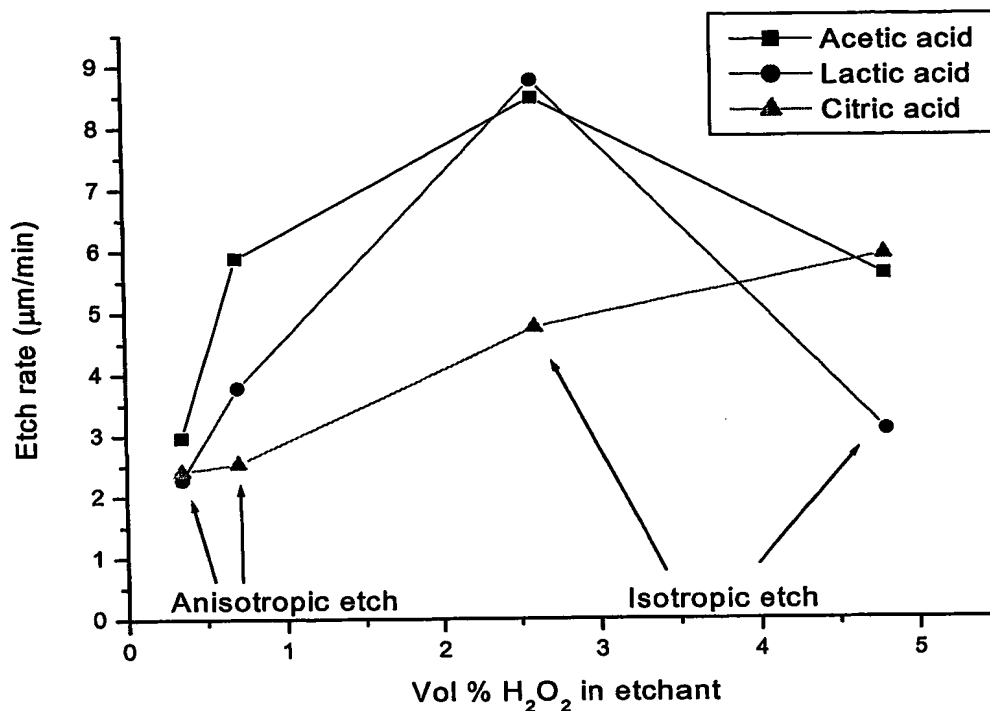
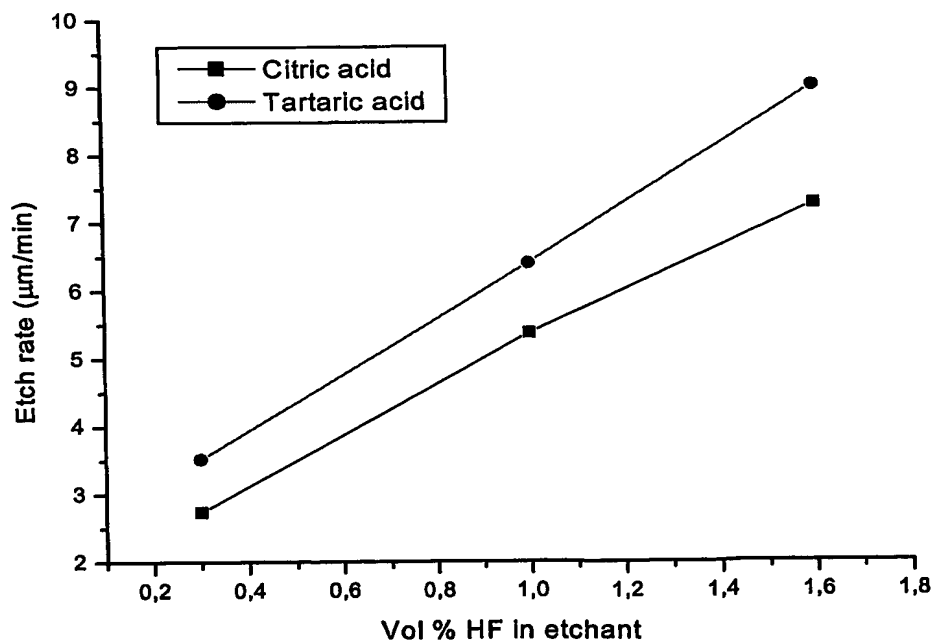


Figure 3. Etch rates of  $\text{Al}_{0.82}\text{In}_{0.08}\text{Ga}_{0.10}\text{AsSb}$  (lattice matched to GaSb) for acetic, lactic and citric acid based etchants as a function of  $\text{H}_2\text{O}_2$  content (see table 2).



5 Figure 4. Etch rates of  $\text{Al}_{0.85}\text{Ga}_{0.15}\text{As}_{0.06}\text{Sb}_{0.94}$  with etchants containing citric and tartaric acid as shown in table 4.

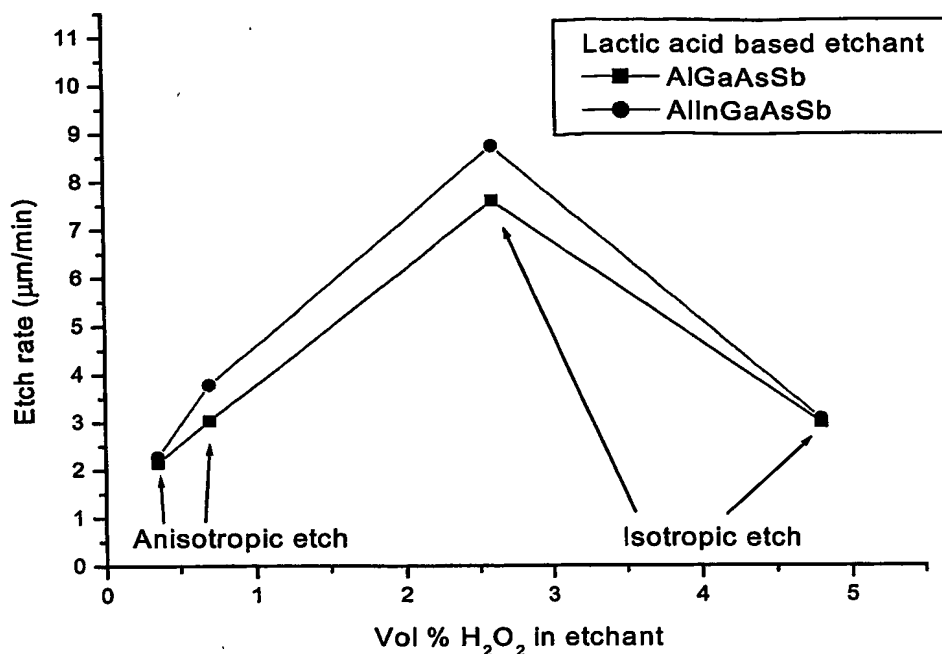
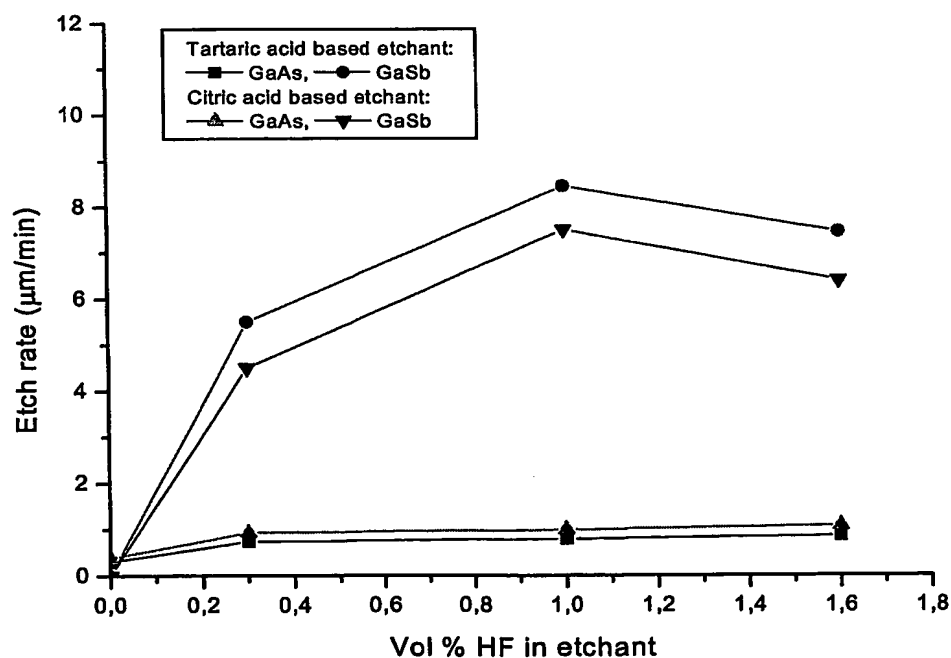


Figure 5. Comparison of etch rates for  $\text{Al}_{0.90}\text{Ga}_{0.10}\text{AsSb}$  and  $\text{Al}_{0.82}\text{In}_{0.08}\text{Ga}_{0.10}\text{AsSb}$  (lattice matched to GaSb) with the lactic acid based etchant (see table 5).



5 Figure 6. Etch rates of GaAs and GaSb substrates for citric acid and tartaric acid based etchants as shown in table 1.

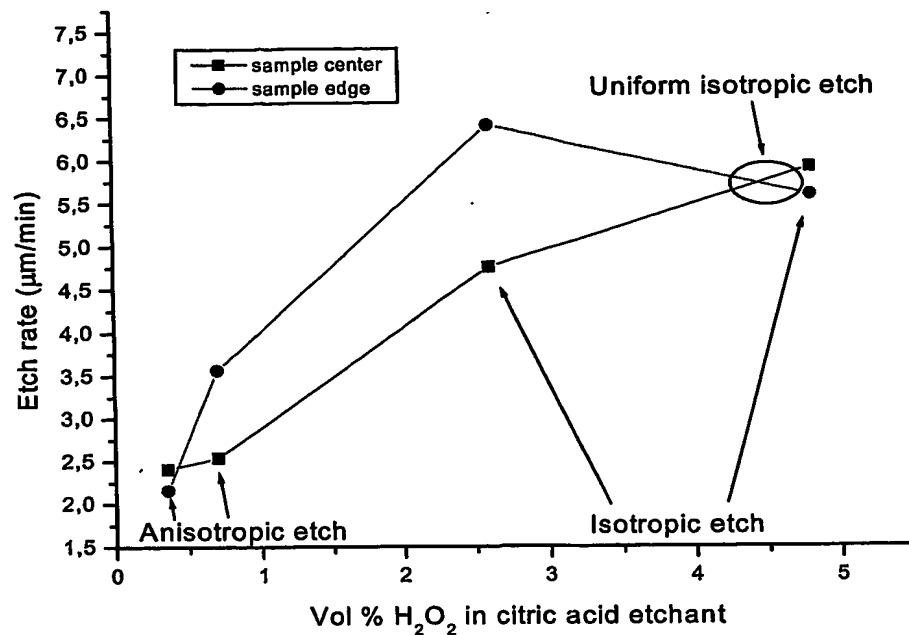


Figure 7. Etch rates from table 3 showing uniform etch across Al<sub>0.82</sub>In<sub>0.08</sub>Ga<sub>0.10</sub>AsSb (lattice matched to GaSb) sample with adjusted concentrations of H<sub>2</sub>O<sub>2</sub> in etchant.

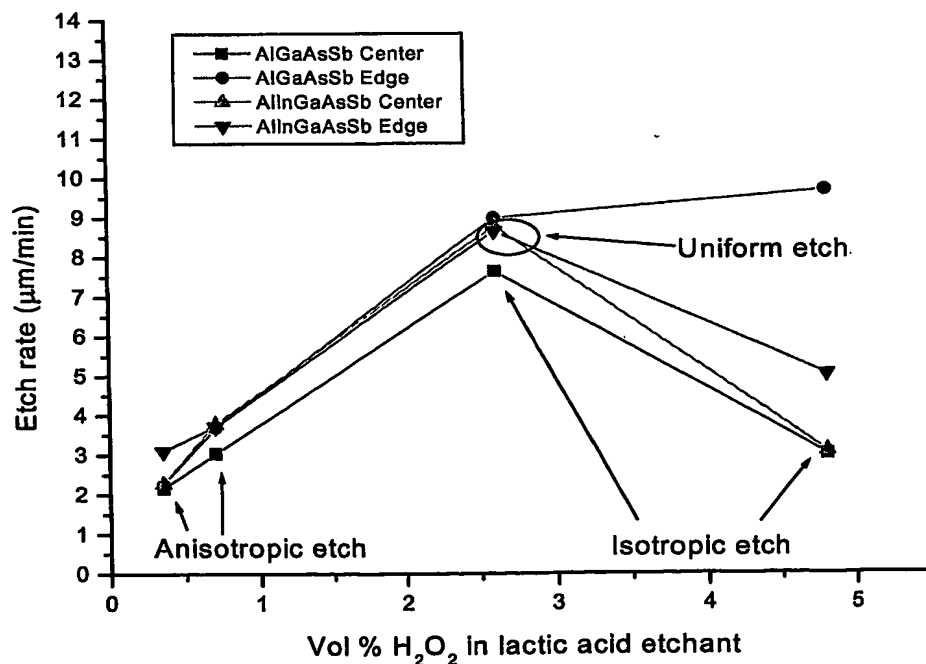
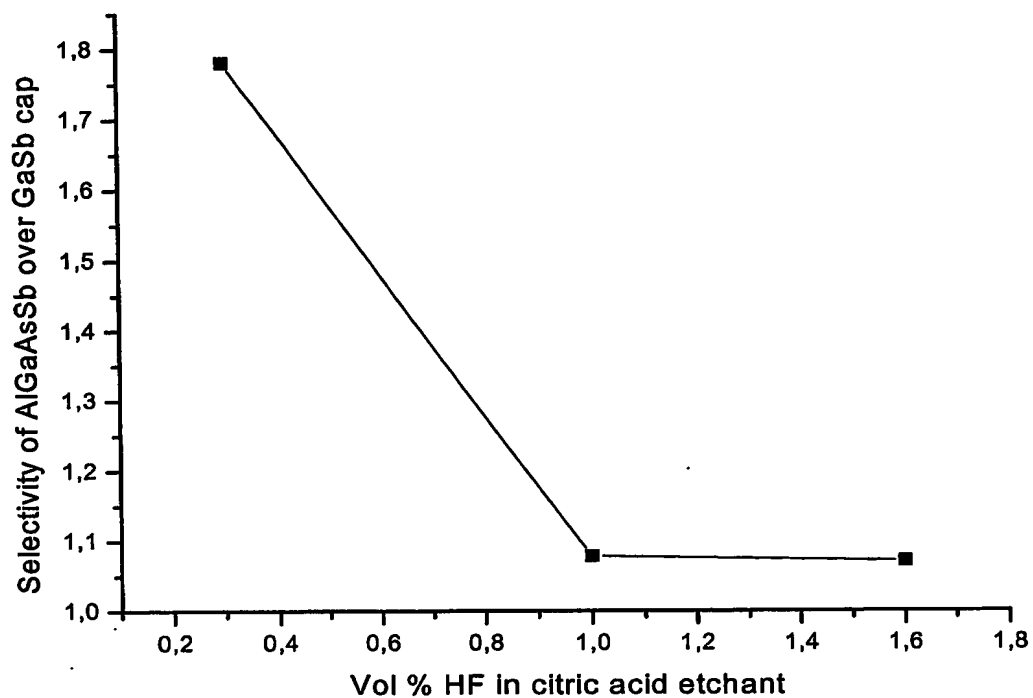


Figure 8. Etch rates of table 7 which suggests increased etch uniformity from the lactic acid based etchant when adding In to Al<sub>0.90</sub>Ga<sub>0.10</sub>AsSb (lattice matched to GaSb).



5 Figure 9. Etch selectivity of  $\text{Al}_{0.85}\text{Ga}_{0.10}\text{AsSb}$  (lattice matched to GaSb) versus the GaSb cap (see table 6). Lowering of the HF concentration, reduces the etch rate of GaSb cap more than for  $\text{Al}_{0.90}\text{Ga}_{0.10}\text{AsSb}$ .

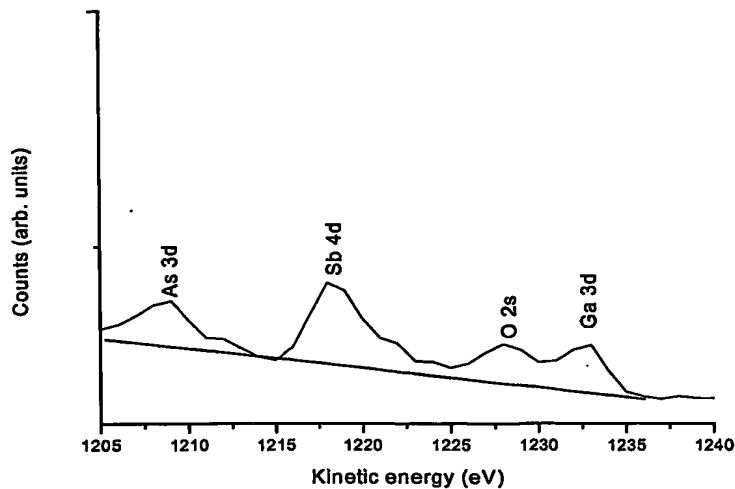
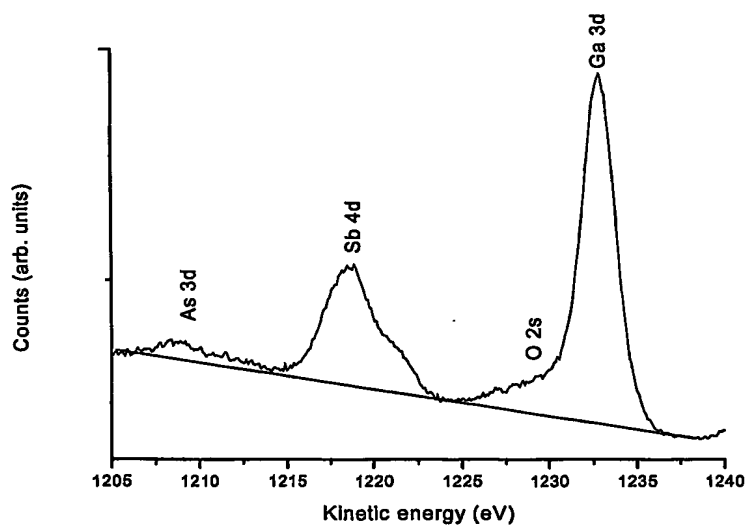


Figure 10. XPS spectra of  $\text{Al}_{0.90}\text{Ga}_{0.10}\text{AsSb}$  (lattice matched to GaSb) after etch with etchant with 0.18 M HF



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Figure 11. XPS spectra of  $\text{Al}_{0.90}\text{Ga}_{0.10}\text{AsSb}$  (lattice matched to GaSb) after etch with etchant with 0.9 M HF

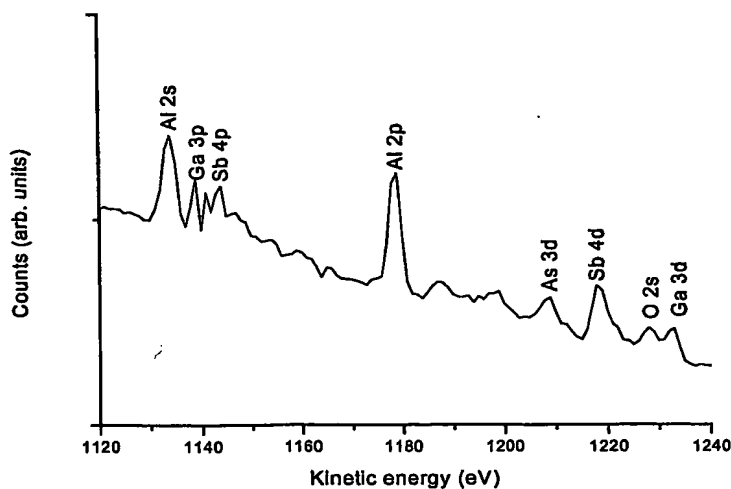


Figure 12. XPS spectra of  $\text{Al}_{0.90}\text{Ga}_{0.10}\text{AsSb}$  (lattice matched to GaSb) after etch with etchant with 0.18 M HF. Al-peak in spectrum shows residue Al oxide on the remaining GaSb substrate after etch.

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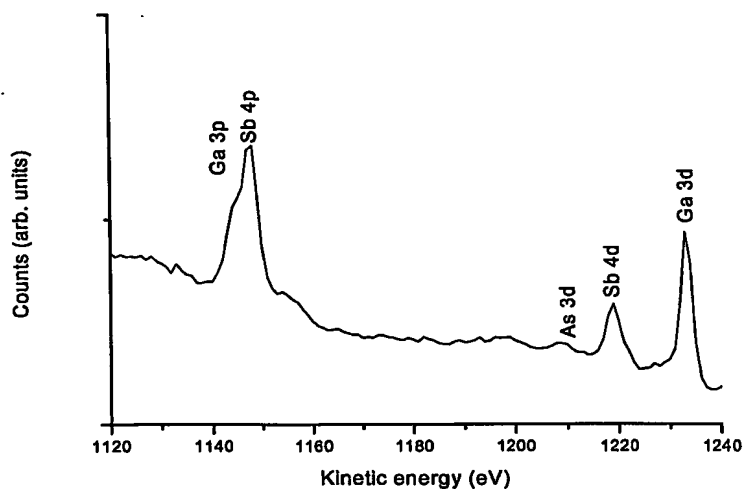


Figure 13. XPS spectra of  $\text{Al}_{0.90}\text{Ga}_{0.10}\text{AsSb}$  (lattice matched to GaSb) after etch with etchant with 0.9 M HF. No Al-peak from the remaining GaSb substrate can be seen, but some As and O signal is present (see figure 11).

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